Intra-segmental timing in sound change: /aw/ in Philadelphia

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Intro
Philadelphia (Labov et al. 2013)
- 1900 /aw/ raising and fronting
- 1950 /aw/ lowering and backing

Assumes /aw/ is a 2-part diphthong. Only describes the movement of the "nucleus" of the diphthong.

Formant Trajectories
Have been investigated with generation as a categorical variable. Jachowicz, Fox & Salmons (2011)
Wholistic measures compared against continuous variables. Rudal & Kohn (2014)
With GAMs, it is possible to model trajectories against continuous variables. Wood (2006)

Methods
Data
Philadelphia Neighborhood Corpus
19,517 tokens of pre-oral /aw/ 279 white speakers

Modelling
Generalized additive models & tensor product smooths
outcome (F1)

Predictors
All non-linear effects and interactions between
- gender
- log2(duration)

Formant Trajectories
- F1 (hz)
- F2

Results
Formant tracks
- formant: F1
- measurement point

max F1 excursion
Timing of F1 maximum shifts diachronically
Target of F1 maximum is more stable.

They interact with duration differently, over time

F1 relative to F2
Delayed F1 maximum keeps F2/F1 difference longer for

Conclusion
It is not straightforward to characterize /aw/ as a 2 part diphthong in Philadelphia.
Along with the shifts in vowel quality, there is a considerable shift in relative timing of vowel formant targets.

This puts /aw/ in line with some consonantal phonetic changes, such as Scottish derhoticization or Andalusian post- aspiration.

References


Further directions
Evaluating and improving quality of automated full formant track extraction.
Incorporating more linguistic (nasals) and social (education) factors into analysis.
Are the F1 and F2 qualities used differentlu for linguistic or sociolinguistic perception?